

**Notice of Allowability**

Application No.

10/561,772

Examiner

Rhonda S. Peace

Applicant(s)

YAMADA, KIYOKAZU

Art Unit

2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the application filed 12/21/2005.
2. ☒ The allowed claim(s) is/are 1-20.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☒ All b) ☐ Some\* c) ☐ None of the:
    1. ☒ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date 12/21/2005
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

*M.R. Connelly-Cushwa*  
MICHELLE CONNELLY-CUSHWA  
PRIMARY EXAMINER

10/29/07

*Rhonda S. Peace*  
Rhonda S. Peace  
Examiner, Art Unit 2874 10/23/07

## **DETAILED ACTION**

### ***Priority***

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Information Disclosure Statement***

The information disclosure statement (IDS) submitted on 12/21/2005 was filed in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

### ***Allowable Subject Matter***

Claims 1-20 are allowed.

The following is an examiner's statement of reasons for allowance: The applicable prior art does not disclose or reasonably suggest An acousto-optic filter comprising: an acousto-optic substrate; an optical waveguide disposed along a surface of the acousto-optic substrate; an interdigital electrode disposed on the acousto-optic substrate, the interdigital electrode exciting a surface acoustic wave; and a surface wave waveguide for the surface wave excited by the interdigital electrode extending in substantially a same direction as the optical waveguide and coupled to the surface acoustic wave excited by the interdigital electrode such that the mode of the light guided to the optical waveguide is converted by the surface acoustic wave, the surface wave waveguide including a phase match condition changer that changes a phase match condition of the surface acoustic wave and the light guided to the optical waveguide at a mutual action area by about 0.235% or more from a state in which

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phases are matched, the mutual action area being an area where the surface acoustic wave and the light guided to the optical waveguide act upon each other, as required by claim 1.

Acousto-optic filters are well known in the optical arts, such as Satorius (US 6556729), Nakazawa et al (US 2002/0021853), and Drenton et al (US 5610760). However, the prior art cited above, and considered to be the closest prior art to the current invention, do not disclose or render obvious the claimed limitations of claim 1.

Satorius discloses an acousto-optic filter where a grating acts on light propagating within a waveguide to couple said light such that it propagates in the cladding of said fiber, wherein the cladding coupled light enters an acousto-optic interaction region. Moreover, surface acoustic waves are generated by an amplifier and input into the acousto-optic interaction region. Within said region, selected frequencies of said cladding-mode light is recoupled back into the fiber core through interaction with said acoustic wave. Frequencies to be selected for core mode propagation are chosen based upon the amplitude and speed of the generated acoustic wave.

While Satorius discloses some of the features of the current invention, several factors make the two patentably distinguishable. For example, the generation of acoustic waves in the current invention is performed by an interdigital electrode, while Satorius uses a wedge shaped acoustic amplifier. Moreover, and more importantly, Satorius does not disclose a phase match condition changer included in the surface wave waveguide. While phase matching occurs in Satorius, thereby allowing the

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coupling of cladding modes into the core of said fiber, phase matching is changed by generating an acoustic wave having a given frequency and magnitude. Once the acoustic wave is generated in Satorius, no physical mechanism exists for changing the phase match condition of the acoustic wave once it is propagated. However, the current invention calls for such a phase match condition changer, and therefore has distinguished itself over the prior art.

Nakazawa et al and Drenten et al both show acoustic-optical devices wherein an interdigital electrode creates a surface acoustic wave, thereby causing light propagating within the core of a fiber to then propagate in the fiber's cladding. However, as seen above with respect to Satorius, Nakazawa et al and Drenten et al do not disclose the surface wave waveguide including a phase match condition changer that changes a phase match condition of the surface acoustic wave and the light guided to the optical waveguide at a mutual action area by about 0.235% or more from a state in which phases are matched.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Nakazawa et al (US 2002/0021853) discloses an acousto-optical device. Satorius (US 6647159) discloses a tension-tuned acousto-optic bandpass filter.

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Satorius (US 6556729) discloses an acousto-optic bandpass filter. Kim et al (US 6535665) discloses an acousto-optic device utilizing longitudinal acoustic waves. Kim et al (US 6021237) discloses an all-fiber acousto-optic tunable filter. Drenten et al (US 5610760) discloses a device for raising the frequency of electromagnetic radiation. Song (US 5400171) discloses an acousto-optic filter with near-ideal bandpass characteristics.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rhonda S. Peace whose telephone number is (571) 272-8580. The examiner can normally be reached on M-F (8-5).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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